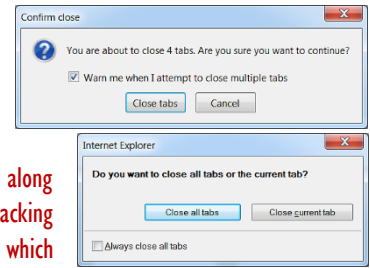


Computer Science 321.001
Human-Computer Interaction Design
Fall 2016
Exam I Solutions

1. (10 points) When a user tries to close Mozilla Firefox after opening multiple tabs, the dialog box at left above appears. When a user tries to close Internet Explorer after opening multiple tabs, the dialog box at right above appears. Discuss which of these two dialog boxes provides superior affordance, explaining why your choice is superior and why the other choice is inferior.

The wording on the Firefox dialog box is much clearer and self-explanatory. The title bar prompts the user with an overview of what's happening instead of a mere reminder of what product is being used. The question mark icon provides an additional visual cue that a response is expected. The precise number of tabs being closed is provided, along with a coherent question, as opposed to Explorer's nebulous either-or phrasing. Firefox provides a clear means of backing out of the action via the Cancel button. The one affordance complaint about Firefox's approach is the check-box, which implies that not checking it will cause all tabs to be closed in the future without a warning, which checking the Explorer check-box more explicitly effects.



2. (10 points) When new users of Netflix's DVD rental service place DVD titles in their Netflix queue, they are often surprised that Netflix immediately mails them the DVD at the top of their queue and, when the users mail it back, Netflix mails them the next DVD on their queue. Instead, these users expect Netflix to wait for user confirmation before sending any DVDs.

Explain the mental model that these users are using under these circumstances and possible changes that Netflix could make to its queueing procedure to avoid this user misconception in the future.

The new users are using the mental model of other e-commerce sites, like Amazon, in which the users fill shopping carts with merchandise, but do not commit to purchase the items in the cart until they perform a separate check-out procedure. Netflix queues are loaded in a manner similar to Amazon shopping carts, making such a misconception understandable. To avoid this problem, Netflix should provide an interface in which the idea that the queue's contents will automatically be mailed to the user is more straightforward, e.g., repeatedly reminding the user that the leading queue DVD will be mailed soon, possibly via images of Netflix envelopes being loaded and delivered.



3. (10 points) Bongo Comics is the publisher of comic books based on the characters from "The Simpsons" television show. Consider the following interview question for a contextual inquiry session during the development of a Bongo Comics application design:

"In a combo box listing Simpsons characters, would you prefer the default character listed in the textbox above the listbox being Bart Simpson, Homer Simpson, or someone else?"

Explain the problems with this question as part of a contextual inquiry, and specify a more effective alternative for obtaining the desired information.

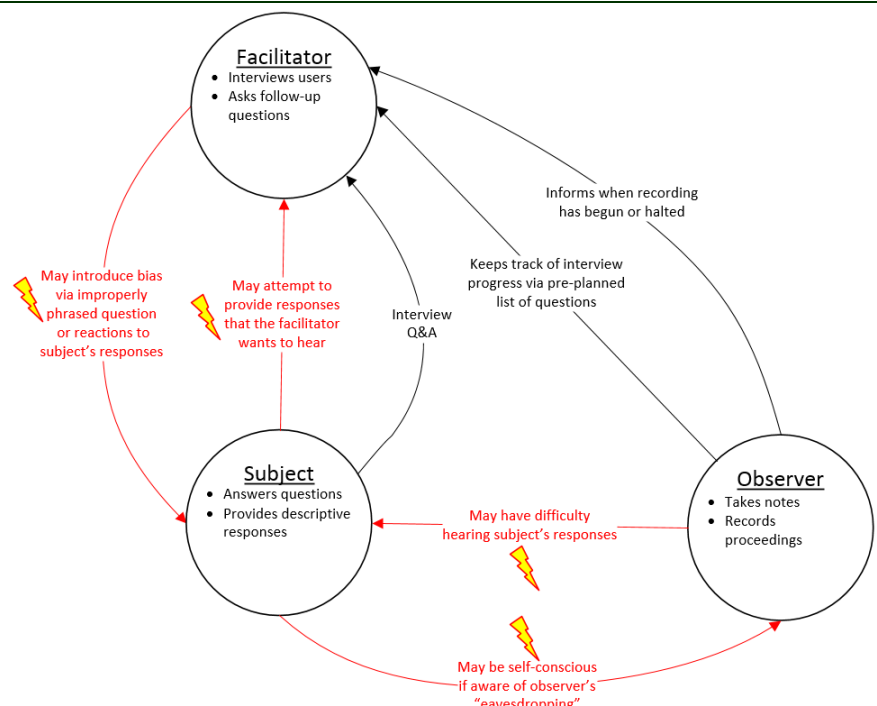
The question relies heavily on HCI jargon ("combo box", "default", "textbox", "listbox") and combines too many ideas into a single, complicated question. A better approach would be to remove the jargon and split the compound question into multiple parts, such as:

- Are you familiar with the Simpsons? What do you think of Bart? How about Homer?
- When listing the characters, which one would you place at the top of the list?



4. (10 points) Sketch a flow model illustrating the interactions that take place during a contextual inquiry interview session between the three participants listed below. Include at least three interactions that would be considered breakdowns (the lightning-bolt interactions) and at least three interactions that would not be considered breakdowns.

- The interview facilitator
- The interview subject
- The interview observer



5. (2 points each) A software development team has been commissioned to develop a new word processing software application. A design team has pooled its observations about the attitudes of the users of previous word processors, producing the following **affinity diagram**:

| Interface Confusion | Positive Features | Unneeded Features | Desired Features | Office Policies |
|--|--|---|---|--|
| The vast majority of the icons at the top of the screen is confusing and rarely used. | The wide variety of fonts available on the system is viewed as a positive feature. | Office communication is in English, so the language translation functionality is unnecessary. | The secretarial staff wants to be able to convert documents into e-mail messages. | Management would like everyone to use the same font sizes and margins in official documents. |
| The purpose of some menus is unclear from their titles, so that functionality is hard to locate. | The staff likes being able to preview entire documents prior to printing them. | All office printers are monochrome, so extensive color palettes are not usable. | All computers have speakers and microphones, so audio attachment would be an attractive option. | The company's logo has been placed into an accessible image file for use as a letterhead. |
| Two-sided printing and stapling are possible, but none of the staff know how to do them. | The pie-chart and bar-chart features are used extensively by marketing staff members. | The footnote, bibliography, and table of contents features are never used by the staff. | While documents are readable on most mobile devices, many staff members need them to be writable. | The spellchecker highlights employee names unless they are added to the system vocabulary. |
| Image formatting in a document involves an elaborate set of mouse and keyboard operations. | Many staff members take advantage of the feature that converts documents into web pages. | No one ever uses the math equation editing feature, which wastes a substantial amount of system memory. | Expanding the vocabulary dictionary to provide actual definitions would be very useful. | To save money, office staff must print all documents duplex and at medium quality. |

The clusters of this diagram are arranged as columns of Post-It notes. **Insert a brief (1-2 words) descriptive label** in the green Post-It note at the top of each cluster. Each label must concisely express the common theme of its cluster, without resorting to vague generalizations (like "Features", "Problems", or "Miscellaneous").

6. (10 points) A software development team is creating a software portal for businesses to use to submit reports to government agencies. In the empty space below this **persona** that was developed for this project, **identify** the components of a persona definition that are effectively **included** here, as well as any necessary components of a persona definition that have been **excluded**.

Dorothy Nielsen is 53 years old and works as a secretary in her husband's plumbing business in the suburbs of Cleveland, Ohio. There are 5-6 assistants and apprentices in the company.

Background

When Dorothy was very young she trained as an office clerk in the accounts department in a department store in Cleveland. She was married at the age of 21 to John who had just got his plumber's certification. They have two grown-up sons who no longer live at home in the combined house and workshop/office. Their sons visit frequently as they still enjoy mom's cooking.

Dorothy likes to keep up with fashion. She often goes to the hairdresser, loves vibrant colors and elegant shoes. When she reads women's magazines, she looks for small tips that she changes and makes her own. She is always smartly dressed and stays fit.

Dorothy loves travelling to faraway countries; most recently, she and her family took a trip to Vietnam this summer. Before they went, she spent time reading up on the country and also watched the film "Indochine" starring Catherine Deneuve. Dorothy always discusses the vacations with John, who would prefer to go to Vegas with old friends, but it is Dorothy who has the final say about the destination.

In an average day, she tends to drink too many cups of coffee, and when the telephone rings incessantly and she can't reach the assistants, she also tends to smoke a bit too much.

Dorothy makes payments to an early retirement benefit account and looks forward to the day when she no longer has to be the "mom" of others any more and can spend more time travelling.

Computer Use

At the plumbing business, Dorothy handles the accounts and the bookkeeping, taxes, vacation pay, pension fund, etc. She uses a financial management software application that she has mastered after many years of use, but sometimes the system is not completely logical.

If she were to use other systems or use new, digital reporting, she would prefer it to be demonstrated to her by someone. She feels unable to learn something new when it is just explained to her, and she dislikes reading user guides. She says it takes her a long time to study anything new and familiarize herself with it, and she tends to see more limitations than possibilities in new IT. Dorothy often underestimates her IT proficiency and overestimates the time that it will take to learn something new, so she stalls before she even gets started.

If she needs IT help, her oldest son and, less often, a woman friend provide the support. The friend works in a big company and is a super-user of the financial management software.



Job Description

Dorothy handles the tax forms for the business. She deals with and reports the wages, vacations, sickness benefits, and maternity leaves of the staff. She manages the annual accounts of the company. In addition, she fills in the reports for the U.S. Small Business Administration and the Better Business Bureau.

Dorothy does not understand the logic of the IT system and does not trust everything to happen as it should. If she sends in a return form or report digitally, she likes a confirmation saying that the recipient has received the form.

Workday

- She is not involved in the plumbing business as a trade, but she knows all of the technical terms.
- She tidies things up. She does not want the others (her husband and the assistants) to make a mess in the basement where the office is as she is the one who has to look at it all day. "Tidy up! Your mom does not work here!"
- She digs in and sometimes has to keep far too many balls in the air at the same time.
- She holds the fort, but does not get a lot of professional recognition in the company from the boss/her husband.
- She answers the telephone, handles mail, deliveries of goods (including invoices and delivery letters), and email.
- She handles the accounts, does some bookkeeping and writes invoices.
- She makes the coffee.
- She has occasional contact with the accountant.
- She does the invoicing of clients.
- She sends/delivers mail every day.
- She sends reminders.
- She handles customer contact (including damage control).
- She also walks the dog.

Future Goals

Dorothy dreams about a future where she no longer has to work and where she can spend more time travelling. She is still debating with John whether they should travel or buy a summer cottage where they can live all year round when they retire.

| | | |
|------------------------|--|---|
| ✓ Name | ✓ Work environment | ✓ Motivation for using technical product |
| ✓ Age | ✓ Technical proficiency and comfort level | ✓ Information-seeking habits and favorite resources |
| ✓ Photo | ✓ Pet peeves (incessant phone ringing, assistant unreachability) | ✓ Personal and professional goals |
| ✓ Personal information | ✓ Attitudes (software system mistrust, IT self-doubt) | ✓ Candid quotes |

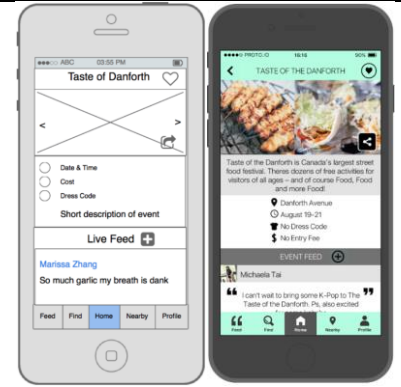
7. (5 points each) In recent years, HCI experts have had fierce disagreements concerning the relative merits of **low-fidelity** and **high-fidelity prototyping**. Use the wireframed low-fidelity prototype at right and the high-fidelity prototype below it to:

a. **Explain** the advantages associated with developing and refining a low-fidelity prototype before developing a high-fidelity prototype.

- The LFP can be put together and modified very quickly, with no actual coding required.
- Basic design flaws are easily identified, resulting in “broad strokes” interface refinement.
- The preliminary look-and-feel of the LFP encourages input from other designers and users.

b. **Explain** the advantages associated with foregoing low-fidelity prototyping completely and just developing a high-fidelity prototype.

- The HFP gives a much clearer notion of the designer’s vision of the application.
- Interactions with the HFP will look much closer to those of a final implementation.
- Potentially distracting secondary features (e.g., color schemes, vertical text) can be pinpointed.



8. (5 points each) For **each** of the factors below, **explain** whether a **decrease** in that factor will cause a **confidence interval** to **widen** or to **narrow**.

a. Confidence level

Decreasing the confidence level will cause the confidence interval to **narrow** (e.g., going from 95% confidence to 90% confidence will narrow the range of possible values that could occur).

b. Data variability

Decreasing the variability of the data will cause the confidence interval to **narrow** (e.g., if data is less widespread, then maintaining a particular confidence level will require a much narrower range of values).

c. Sample size

Decreasing the sample size will cause the confidence interval to **widen** (i.e., less sample data decreases the certainty that the sample data represents the overall population).

9. (5 points) Recall the formula for the **t-statistic**:

$$t = \frac{M - \mu}{(s/\sqrt{n})}$$

Specify which of these variables is usually not available when studying a sample data set and **explain** how that variable is usually approximated in order to calculate the t-statistic.

The mean of the entire population, μ , cannot be practically obtained, making it “hypothetical”. Instead, an approximation for that value that is based on previous related studies (or, more commonly an accepted ceiling on the critical difference between M and μ) is actually used in computation.



10. (10 points) Weather applications, like The Weather Channel software pictured above, are among the most common applications for mobile phones. **Explain** what **specific** interactive aspects of the mobile phone user interface lend themselves to weather applications like this.

Most of the image-oriented functionality of weather applications is based on maps, which easily lend themselves to the kinds of touch or stylus interactions available on mobile phones. In addition, most of the text-based functionality of these applications relies on limited text entry (e.g., zip code, city/state, date), and most of the desired display text (e.g., current temperature, brief forecast, airport/road conditions) consumes little screen real estate.